

Copenhagen; but unfortunately I am unable to state whether Danish or foreign measures have been employed.

	feet.	inch.
From the tip of the beak to the hindmost end of the blowers	3	0
" " " " the dorsal fin	12	10
" " " " notch of the tail	17	1
From the tip of the beak to a line supposed to be drawn between the points of the flukes of the tail	18	1½
From the notch in the tail to the anus	5	3
" " " " penis	6	5½
" " " " umbilical cord	7	5½
From the tip of the beak to the pectoral fin	5	0
" " " " eye	3	0½
" " " " ear-opening	4	1½
Length of the blowers	0	5½
Distance between the blowers behind	0	3½
" " " " in front	0	0¾
Length of the dorsal fin along the back	1	0
Height of the dorsal fin	0	4½
Length of the pectoral fin	2	9
Greatest breadth of the pectoral fin	0	9
Distance between the points of the flukes of the tail	3	3
Girth of the head in the middle between the eye and the ear-opening	7	2½
Girth of the body across the pectoral fins	7	0
" " " " at the umbilical cord	6	6
" " " " penis	5	5½
" " " " anus	4	7
" " " " just before the tail	2	2
Perpendicular diameter of the body at the pectoral fins . .	2	8
The same, at the umbilical cord	2	5
The same, at the anterior edge of the dorsal fin and anus	1	9½
The same, at the posterior edge of the dorsal fin	1	7
The same, at the base of the tail	1	0
Number of furrows in the belly between the pectoral fins	66	
Ditto beneath the place where the ear-openings are found	82	

XL.—*Notes on the Lodoicea sechellarum, Labill.* By EDWARD PERCEVAL WRIGHT, M.D., F.L.S., Professor of Zoology, Trinity College, Dublin.

IN June 1867 I was invited, by Swinburn Ward, Esq., H.M. Civil Commissioner for the Seychelles Islands, to accompany him on a tour of inspection around the Island of Praslin. I was at that time engaged in exploring the forests of Mahé, the largest and most populous island of the group; but anxious to visit the native island of the well-known "Coco de mer," I at

once accepted the invitation, and prepared to spend two or three weeks on Praslin. As we glided gently through the passage in the coral-reef that runs along the eastern coast of Praslin, the first object that met my view was a clump of the *Lodoicea sechellarum*; there were four or five trees, growing erect and to a height of about forty feet, from between a mass of granite boulders quite close to the sea-shore.

To study the structure of this noble palm-tree, to find out all I could about its life-history, to ascertain the probable rate of growth of its stem, the duration of its flowering period, and to bring back with me to Europe young growing plants were some of the chief objects of my visit to this group of islands.

For centuries the history of this palm had been involved in mystery; its strange-shaped nuts had been now and then found washed ashore on the Maldivé Islands or floating about on the surface of the Indian Ocean; but its native country, or what kind of tree it was that produced such nuts, was unknown. Tradition said it was a production of the sea. Rumphius believed in tradition, and assures us that it is not the product of a terrestrial plant that had fallen into the sea, but a veritable marine fruit; and sailors who never heard of Rumphius told strange stories of the tree itself growing beneath the salt water, with large bunches of the double cocoa-nuts hanging from its branches; but when they would dive to gather the nuts, the nuts and the tree and all would disappear. Of course, if this were true, there was little chance of the double cocoa-nuts becoming common; and so the few that were found floating were sold for very enormous prices; those that landed on the Maldivé Islands were the property of the king, who had a very severe law of "treasure trove," by which it was enacted that the person finding these nuts and not bringing them to the king should be put to death.

The discovery of the Seychelle Islands by Captain Lazare Picaults, of the 'Elisabeth,' despatched on a voyage of discovery from the Isle of France by M. Mahé de Labourdonnais, set the question of the native country of the double cocoa-nut at rest, and determined the fact that they were the products of a gigantic palm-tree. Sonnerat, in his 'Voyage to New Guinea,' gives a description of this tree, which he found on Praslin. Commerson described it in MS. under the name of *Lodoicea*; and La Billardiére, in the 'Annales du Muséum d'Histoire Naturelle,' gave a botanical description of it, accompanied by figures drawn from spirit specimens of the fruit, and a drawing of the tree from nature by M. Lilet. M. Quéau de Quincy appends to this paper some remarks on the economic value of

the palm. This M. de Quincy was the last administrator of the king of France. He was then named military commandant and civil agent for the French republic; and having in May 1794 surrendered to the summons of Capt. Newcome, of H.M. frigate 'Orpheus,' he was appointed acting commissioner to the English government, which position he occupied at his death. He is buried on the summit of a little knoll not ten minutes' walk from Government House; and by his tomb, of white coral, the English flag is hoisted on all holidays and fête-days throughout the year.

Some few years more elapsed until Mr. Telfair, a gentleman well known in connexion with the botany of the Mauritius, obtained specimens of the male and female fruit, and forwarded them to Sir W. J. Hooker, then Regius Professor of Botany in the University of Glasgow, whose account, in the first volume of the new series of Curtis's 'Botanical Magazine' (1827), leaves very little indeed to be added to the general description of the palm (plates 2734–2738).

Since then, Dr. Barnard and my friend Mr. Swinburn Ward have published contributions to the history of the palm.

We landed on the eastern side of Praslin; and while the seine-net was being dragged to provide us with some fish for breakfast, I walked to the place where I had seen the *Lodoicea*. Passing along by the sea-side, I found the sandy beach strewn with innumerable flowers of *Barringtonia* —?; fringing the sea, and in many places growing in it, was a species of *Scaevola*. The double-cocconut trees were all male plants; the ground at their feet was covered with the remains of the long catkins, crumbling into dust when touched. The trees appeared to grow almost out of the rock, and the little earth seen near the roots was a tenacious yellow clay. Two, and sometimes three, leaves hung suspended from the stem. In the distance, along the coast and up the mountains' side, I saw other specimens; but they were but thinly scattered along this eastern side of Praslin. I had, however, other and better opportunities of seeing and examining much finer specimens than are to be met with on this side of Praslin, and I hope, in a small work which I am at present engaged in writing, to give an account at some length of the *Lodoicea*, and to accompany the chapter on this subject with a figure thereof from a photograph, and with illustrations of the ripe nut and sections of the stems of both young and old trees. In these notes I purpose only to give, as briefly as possible, an account of the *Lodoicea*-forests of Praslin and Curieuse, to state the facts that I have collected that bear on the question of the age of the

trees, and to conclude with a few words on the introduction of this palm into Europe. In March, 1864, Sir W. J. Hooker read to the Linnean Society extracts from a letter from Mr. Swinburn Ward relating to the Coco de mer, which concluded with the statement that "not many years will elapse before the Coco de mer becomes in reality as rare as it was supposed to be when picked up at sea by the wondering mariners; and the only relics left of its former magnificence will be the decaying stumps of the trees, so wantonly destroyed, and the curious sockets in which they stood for so many years." This statement naturally alarmed all botanists; and, at the request of the Linnean Society, Mr. Ward kindly visited both Praslin and Curieuse for the purpose of examining into the subject a little more closely, and came to the conclusion that, although many hundreds of this palm-tree had been destroyed on the north-west of Praslin, yet that several large forests still remained, and that the tree was not at all likely to become extinct.

The island of Praslin lies nearly north-west and south-east; a range of mountains, some 1500 feet in height, runs from one end to the other of the island. It is several miles broader on its south-eastern than on its north-western side; and here there is a large deep bay, in the mouth of which stands a little island, called Isle Ronde. On the eastern side of Praslin lies Isle Curieuse, separated from Praslin by a strait from half a mile to a mile in width. In the midst of the mountain-range on Praslin there are several deep valleys, where for the most part the indigenous flora is still untouched. It would appear that the *Lodoicea* is indigenous on Curieuse, Praslin, and the little Round Island, and that wherever else it is met with on the Seychelles it has been planted by the hand of man. On Isle Ronde only two or three are to be met with. On Curieuse, which is government property, a large number of trees are to be found, chiefly on the northern side of the island. On the southern side the soil is very poor, and there is but little of it (for, the underwood here having been destroyed, the soil has been to a great extent washed away), and the *Lodoicea* grows to a height of not more than from ten to twelve feet; on the northern side, however, there are some very fine trees. This island is the seat of a leper-establishment, perhaps the only one ever supported by the British Government. It would appear that, shortly before the passing of the Act for the emancipation of slaves in the British Colonies, it had been represented to the then Ministers of the Crown that very many unfortunate lepers were living in a state of utter destitution on many of the smaller coral islands so numerous in the Indian Ocean.

All, or at least the great majority, of these had been conveyed to, and abandoned on, these islands by their masters, who thought in this way to stop the spread of leprosy among their gangs of slaves. The first effect of these representations was the selection of the Isle Curieuse for a leper-establishment, and the building of two leper-camps on its western side, at a place well sheltered, and where a little stream runs down into the sea—that on the right side of the stream for the male, and that on the left side for the female lepers. Thither, in October 1829, George Forbes, an active and intelligent native of Scotland, being appointed as overseer, proceeded, bringing with him one leper. In a very short time afterwards the brig 'Hebe,' having visited the different islands inhabited by lepers, arrived off Curieuse and landed some two hundred more. In Mr. Forbes's letters of instruction, special directions are given not to permit the leaves of the *Coco de mer* to be cut, or the nuts to be eaten; and he is desired to plant, once a month, all mature nuts found on the ground, at a distance of ten paces from each other. Boats were forbidden to land, unless in charge of some responsible officer. The lepers were not allowed to leave the island. All fish and turtle caught were to be divided; but it was forbidden to eat the tortoise-shell turtle, though its shell was to be sent to the Governor. Sardines were not to be eaten until their heads were taken off and they were well cleaned; and, lastly, Mr. Forbes is urgently admonished to be kind and forbearing to the unfortunate beings placed under his care.

It is interesting to read over these instructions, and to see that even then care was taken to preserve the *Coco de mer*; but as I perceive, from the date of the letter of instruction, that Sir W. J. Hooker's letters and description of the palm would have reached the islands just at this very time, I do not think I am far wrong in ascribing this care, in a great measure, to a desire to meet his wishes; and here I may add, on the testimony of several Civil Commissioners, and as the result of my own experience (for, as Acting Government Medical Officer, I had the care of Isle Curieuse), that from 1829 until the present time, for now nearly forty years, Mr. Forbes has acted up to the spirit as well as to the letter of his instructions, both as regards the beautiful palm-tree and the disease-stricken inhabitants of the island. As this island is still government property, we may be sure that as long as it keeps its head above the encroaching waters of the Indian Ocean, it will remain the home, as it is the cradle, of this species.

It is, however, in Praslin that the *Lodoicea* is to be seen in all its glory. Perhaps the forest easiest to visit is that on

the south-eastern side of the island, the property of Mr. Campbell; here the trees grow in great numbers, down even to the water's edge. The largest (some are from 100 to 130 feet high) are met with in the valley. Male and female trees are found in nearly equal quantities. On this property a certain number of the trees are stripped of their leaves to supply the demand for this article at Mahé, where they are manufactured into hats, fans, and baskets. A certain number of nuts are allowed to remain on the ground to germinate, and, besides these, a large number fall that are never found; and a good number are sent to Mahé and to the Mauritius for sale. But unless some sudden catastrophe happen to this forest, which contains many thousand trees of all sizes and ages, it will long remain a sight well worthy of being visited by the curious.

Another, and to my mind more magnificent, forest of this palm is to be met with in a large valley situated in the mountains between the cocoa-nut plantation on the eastern side, over which Mr. Osucree is the agent, and the Protestant schoolhouse and church on the western side. A walk of some two hours from the worthy and hospitable agent's house brings one to the summit of the mountain, and then this noble valley bursts upon one's view; but in the space I allow myself for these notes I cannot do justice to this subject. The valley may be, in its narrowest portion, about a mile wide and some 500 feet deep; in its centre a little rivulet commences, that meanders through a narrow valley looking towards the north-west. Here were to be seen hundreds of *Verschaufeldia grandiflora* and a *Stevensonia*, growing to a height of thirty to forty feet. In sheltered nooks there were groves of a tree fern, with stems fifty feet in height; but towering like giants among these pigmies were very many (too many to count) of the *Lodoicea sechellarum*, often growing in threes—two female trees, and between and somewhat overshadowing them a male tree. They were from 100 to 150 feet in height, and were in all stages of fruit and flower. The spathe of the male spadix is smaller than the spathe of the female spadix; and the latter, by the time the fruit ripens, becomes very hard and spike-like. It is this portion that the creoles allude to when they tell one that "the fruit-stalk is supported by three strong bracts, the outer one of which penetrates the stalk immediately above it, in the underside of which nature has left a fissure accessible to it: by this provision the stalk is enabled to support the weight of fruit which hangs on it"*. I found, on all the trees that I

* Journal of the Linnean Society, vol. viii. p. 137. Of course I do not ascribe this theory to my friend Mr. Ward, although I here quote from his interesting paper.

examined, a parenchymatous barky layer, that in trees that had fallen for some time was easily peeled off. This barky layer was very curiously pitted; this pitting was caused by the intrusion into the parenchymatous layer, and piercing through it, of the woody fibres of the stem; but without illustrations it would not be easy to explain this structure, and I must therefore reserve it for another occasion. Some of the so-called "bowls" were met with on the mountain-slopes: here I need only add that sections made through both young and old trees revealed no peculiarity of structure in this portion of the stem other than what is met with in almost all palms.

From an examination of all these forests, I arrived at the conclusion that the growth of the stem depended very much on the soil in which it grew; and I was pleased at being able to determine this by the following facts. Many nuts have been planted on Isle St. Anne, in different parts of Mahé, and at Silhouette, and the date of the planting of these nuts is in many cases known with great accuracy. Thus Mr. Charles Savi planted some seven or eight at Silhouette in one long row, some twenty feet apart, on the side of a mountain, but only some two or three feet above high-water mark; the nuts were planted at the same time, in the year 1812. Of these, some six germinated, and for the first year or two grew without one showing any great advantage over the other; now, after the lapse of fifty-six years, three of these trees (two females and one male) measure four feet in diameter at the base of their stem, which is twenty-six feet in height, and they bore their first fruit and flowers in the year 1851, when they were, as nearly as possible, forty years old: the other three are to this day without *stems*, and have borne neither fruit nor flowers. At first, recollecting the result of recent researches into the arrest of development of the axolotl, I thought here might be a similar case among plants; but on a little investigation I found that the thriving Cocos de mer had fallen upon good ground, where they could grow abundantly, and that the others had fallen upon poor, stony soil, where the puzzle was to find from what they did get sufficient food to keep them alive now these fifty-five years. Many other facts like this I could quote; but sufficient has been said to show the danger of drawing conclusions as to the slow growth of trees from their slowness of growth under cultivation: and this leads me to say a few words as to my hopes of introducing these trees into this country.

I brought with me, in December 1867, to Alexandria, three young trees, about three years old, of this palm. The weather was too cold at this period of the year to permit their being

brought either to Paris or Kew; and I left them in the care of my good friend Mr. Calvert, H.B.M. Vice-Consul at Alexandria, well known as an excellent botanist, who gave them to that excellent horticulturist Herr Winterstein to keep during the winter. Unfortunately these trees did not survive; but, thanks to M. Adrien, of Isle Praslin, and Mr. Ward, I hope in spring next, when the weather becomes a little warm, to receive some young plants which have been germinated in tubs, and which will thus not have had the risk of being transplanted. These I shall hand over, when they arrive, to the gardens of Kew and Dublin; and I have no doubt they will be well taken care of.

In some of the volumes of Curtis's 'Botanical Magazine,' excellent hints on the cultivation of plants will be found, given by Mr. John Smith of Kew. It would be well for our plant-growers if they would oftener read through and digest these articles. In treating of the cultivation of *Lagetta lintearia*, Lam. (tab. 4502), he remarks on the hints given to him for his guidance in growing this plant by Mr. Wilson (who found the plants growing on their native soil):—"We are always most desirous to pay attention to information as regards the native habitats of plants; but in cases like the present we have found that when too strictly adhered to, successful cultivation does not always follow. In our experience we have never found any plant thrive by retaining it in its native soil. If we could only imitate all the various influences of climate that modify and control the growth of plants in their native localities, then we might do so." These very correct remarks it will be well to bear in mind when the time comes, as I hope it will soon, for us to cultivate this fine palm in our stoves; for most certainly the *Lodoicea* will not grow under cultivation in the Seychelles Islands, when planted in rocky, stony ground such as the trees are found to flourish in in their native forests of Praslin and Curieuse, and yet there there is no necessity to imitate the climate: how much less, therefore, will it grow with us, if subject to the same treatment, when with us it would seem practically impossible to imitate the alternate wet and dry seasons of the tropics!

XLI.—Notes on the Distribution in Time of the various British Species and Genera of Graptolites. By HENRY ALLEYNE NICHOLSON, D.Sc., M.B., F.G.S.

SPEAKING generally, the Graptolitidæ may be said to be characteristic fossils of the Silurian period; and the generaliza-